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(FILE 'HOME' ENTERED AT 19:36:14 ON 22 SEP 2003)

FILE 'CA' ENTERED AT 19:36:22 ON 22 SEP 2003

L1 886 S (CHEMILUM? OR LUMINESC?) AND(POLYMER? OR PLASTIC OR POLYPROP? OR
POLYETH? OR NYLON OR TEFLON OR POLYCARBON?) (7A) (STABIL? OR DEGRAD? OR
DECOMP?)
L2 281 S L1 AND(OXIDAT? OR OXIDIZ?) (7A) (STABIL? OR DEGRAD? OR DECOMP?)
L3 246 S L1 AND(CHEMILUM? OR LUMINESC?) (7A) (DETECT? OR DETERMIN? OR MEASUR? OR
MONITOR? OR TEST? OR ANALY? OR ASSAY? OR ASSES? OR EXAMIN? OR CHECK? OR
SENSE# OR SENSING OR PROBE# OR PROBING OR EVALUAT?)
L4 122 S L2 AND L3
L5 283 S L2-3 NOT L4
L6 82 S L5 AND(RAPID OR HEAT STABILIZ? OR(INTENSITY OR THERMOOXIDA? OR
EVALUAT?) (3A) (CHEMILUM? OR LUMINESC?))
L7 21 S L1 AND(COMBINATOR? OR ARRAY OR PLURALITY OR MULTIPLE OR PARALLEL OR
SIMULTANEOUS)
L8 213 S L4,L6-7
L9 191 S (L8 NOT PY>2001) OR(L8 AND PATENT/DT)

=> d 19 bib,ab 1-191

L9 ANSWER 1 OF 191 CA COPYRIGHT 2003 ACS on STN
AN 138:238615 CA
TI **Evaluation of stabilizer performance in polymers using chemiluminescence**
AU Billingham, Norman C.; Fearon, Peter; Whiteman, David J.; Marshall, Niall;
Bigger, Stephen P.
CS School of Chemistry, Physics and Environmental Science, University of
Sussex, Brighton, BN1 9QJ, UK
SO Addcon World 2000, Two-Day Conference, 6th, Basel, Switzerland, Oct. 25-26,
2000 (2000), paper7/1-paper7/7 Publisher: Rapra Technology Ltd., Shrewsbury,
UK.
AB **Chemiluminescence** (CL) technique offers a promising alternative to thermal
anal. in measuring oxidn. induction times. The much higher sensitivity of
CL detection than that of differential scanning calorimetry indicates the
possibility of making measurements at lower temp., closer to real degrdn.
conditions. CL imaging can also allow real-time monitoring of the
heterogeneity of polymer oxidn. Oxidn. induction times values measured in
the CL instrument can be used effectively to evaluate **stabilizer** performance
in **polymers**.

L9 ANSWER 16 OF 191 CA COPYRIGHT 2003 ACS on STN
AN 135:93969 CA
TI The use of **chemiluminescence analysis** to **measure** hydroperoxide levels in
photo-oxidized polyester/melamine surface coatings
AU Lukey, C. A.
CS Faculty of Engineering, University of Wollongong, Wollongong, Australia
SO Progress in Organic Coatings (2001), 41(1-3), 129-134
AB **Chemiluminescence** (CL) anal. has been used to quantify hydroperoxide concns.
as a function of UV exposure time (UVA), for a no. of polyester/melamine
surface coatings on aluminum substrates. Kinetic anal. of the results
allows the evaluation of three parameters: k1, the hydroperoxide formation
rate const.; k2, the hydroperoxide decompn. rate const. and C0, the initial
chromophore concn. It was found that k1 correlates with rate of film
ablation, obsd. when clearcoat formulations were subjected to exterior
exposure in a tropical environment.

L9 ANSWER 19 OF 191 CA COPYRIGHT 2003 ACS on STN

AN 135:20288 CA
 TI **Degradable polyethylene** and test methods
 AU Khabbaz, F.; Albertsson, A. C.
 CS Department of Polymer Technology, Royal Institute of Technology, Stockholm, SE-100 44, Swed.
 SO Polymer Preprints (American Chemical Society, Division of Polymer Chemistry) (2001), 42(1), 384-385
 AB Different pro-oxidant systems are used in low-d. polyethylene (LDPE). The pro-oxidant formulation used consisted of manganese stearate and natural rubber (NR) or manganese stearate and styrene-butadiene rubber (SBR). The effect of the pro-oxidant system on the thermo-oxidn. of LDPE was **evaluated** using **chemiluminescence** (CL), size exclusion chromatog. (SEC), differential scanning calorimetry (DSC), thermogravimetry (TGA), and fourier transform IR spectroscopy (FTIR). Degrdsn. products were identified by using gas chromatog.-mass spectrometry (GC/MS). The results showed that LDPE contg. the pro-oxidant with NR showed the highest degrdsn. rate.

L9 ANSWER 20 OF 191 CA COPYRIGHT 2003 ACS on STN
 AN 134:367659 CA
 TI Use of a CCD imager for **simultaneous** DSC-**chemiluminescence** and **multiple** sample **polymer degradation** studies
 AU Woo, Lecon; Sandford, Craig; Blom, Henk; Ling, Michael T. K.; Ding, Samuel Y.
 CS Baxter Healthcare, Round Lake, IL, 60073, USA
 SO Proceedings of the NATAS Annual Conference on Thermal Analysis and Applications (2000), 28th, 246-251
 AB Digital electronic imaging using Charge Coupled Devices (CCD) has become popular due to its mass adoption in the personal computer and photog. applications. The CCD sensors are moderate in resoln., extremely sensitive, offer wide dynamic range, and compared with photo-multipliers, capable of withstanding exposure to bright light without damage. These characteristics made CCD **detectors** ideal for **chemiluminescence** (CL) studies for **polymer oxidative degrdsn.** We will present the use of a CCD imager with a DSC for **simultaneous** oxidative induction time (OIT) and CL studies. In addn., since these CCD imagers are inherently area imagers, making them easily adapted for **multiple** sample studies.

L9 ANSWER 22 OF 191 CA COPYRIGHT 2003 ACS on STN
 AN 134:340811 CA
 TI Various patterns of **chemiluminescence**-time runs from thermally oxidized polymers
 AU Matisova-Rychla, Lyda; Rychly, Jozef
 CS Polymer Institute, Slovak Academy of Sciences, Bratislava, Slovakia
 SO Polymer Preprints (American Chemical Society, Division of Polymer Chemistry) (2001), 42(1), 377-378
 AB **Chemiluminescence** (CL) **measurements** were carried out at 120° on polypropylene (iPP, PP), low-d. polyethylene, and poly(2,6-dimethyl-p-oxyphenylene) samples to examine their thermooxidative degrdsn. behavior. The effect of the main initiating routes for degrdsn. on the resulting shape of CL-time runs is reported. An equation describing uniformly all kinetic runs of CL is proposed.

L9 ANSWER 24 OF 191 CA COPYRIGHT 2003 ACS on STN
 AN 134:296371 CA
 TI The effect of physical parameters of isotactic polypropylene on its oxidisability **measured** by **chemiluminescence** method. Contribution to the spreading phenomenon
 AU Rychly, J.; Matisova-Rychla, L.; Tiemblo, P.; Gomez-Elvira, J.

CS Polymer Institute, Slovak Academy of Sciences, Bratislava, 842 36, Slovakia
SO Polymer Degradation and Stability (2001), 71(2), 253-260
AB The phys. parameters of the PP powd. samples like av. molar mass, the degree of isotacticity and the resulting crystallinity and melting temp. have an important effect on the oxidisability of PP expressed in induction time of oxidn. or in max. **chemiluminescence** intensity. It is the increase of both the av. molar mass and the degree of isotacticity which predominantly lead to the longer induction times of oxidn. while the opposite is true for max. **chemiluminescence** intensity for molar mass 40,000-180,000 and temp. interval 80-130°C. The combined model of the homogeneous increase of concn. of hydroperoxides in the oxidn. micro-zones and the spreading of the oxidn. from these micro-zones has been proposed which fits well the exptl. runs of **chemiluminescence** intensity-time.

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L9 **ANSWER 28 OF 191** CA COPYRIGHT 2003 ACS on STN

AN 134:163788 CA

TI Evaluation of thermal **stability** of isotactic **polypropylene** by using **chemiluminescence** technique. Part II. Triazinic additives

AU Jipa, Silviu; Zaharescu, Traian; Setnescu, Radu; Setnescu, Tanta; Giurginca, Maria; Wurm, Doina

CS Centrul de Cercetari Avansate, ICPE, Bucharest, Rom.

SO Materiale Plastice (Bucharest) (2000), 37(2), 63-69

LA Romanian

AB Thermal stabilization of i-PP due to a series of mercaptotriazines was studied by **chemiluminescence** at 180°C. Four concns. (0.15; 0.25; 0.50 and 0.75% wt./wt.) were prepd. The most relevant kinetic parameters of **oxidn.** (induction time, **degrdn.** rate, max. CL intensity, time for attaining max. CL intensity) were calcd. Their activities and stabilities were evaluated relative to unprotected i-PP and i-PP stabilized with a std. antioxidant (Irganox 565) at the some concns. A certain order in the stabilization efficiency was stated and some of the studied mercaptotriazines had higher capability to prevent oxidn. than com. compds.

AB 5

~~10~~ **ANSWER 29 OF 191** CA COPYRIGHT 2003 ACS on STN

AN 134:148277 CA

TI Evaluation of the **oxidative stability** of multiextruded **polypropylene** as assessed by physicomechanical **testing** and **simultaneous** differential scanning calorimetry-**chemiluminescence**

AU Fearon, Peter K.; Marshall, Niall; Billingham, Norman C.; Bigger, Stephen W.
CS School of Chemistry, Physics and Environmental Science, The University of Sussex, Brighton, BN1 9QJ, UK

SO Journal of Applied Polymer Science (2000), Volume Date 2001, 79(4), 733-741

AB Common physicomech. tests comprising impact strength, the melt flow index (MFI), and the yellowness index (YI) were used to study the thermooxidative **stability** of **polypropylene** (PP) following multipass extrusion. DSC coupled with **chemiluminescence** (CL) **monitoring** was also used to **assess** the stability. Three PP formulations were studied: (i) PP-1 contg. 0.050% wt./wt. of the phenolic antioxidant Irganox 1010, (ii) PP-2 contg. 0.028% wt./wt. Irganox 1010, 0.056% wt./wt. of the phosphite costabilizer Irgafos 168 and 0.014% wt./wt. of the lactone processing stabilizer HP 136, and (iii) PP-3 contg. 0.050% wt./wt. Irganox 1010 and 0.100% wt./wt. of the phosphite Ultrinox 641. All formulations contained 0.045% wt./wt. of the hydrotalcite acid scavenger DHT-4A. The results suggest that physicomech. tests cannot reliably detect the small difference in the stability between PP-2 and PP-3 but can detect the larger difference between these and the less stable PP-1. The oxidative induction time (OIT) detd. by CL monitoring (i.e., CL-OIT) is consistent with the OIT detd. by DSC but has better reliability. The CL-OIT data suggest that PP-3 has superior **oxidative**

stability to PP-2 in the early stages of multipass extrusion. However, PP-2 exhibits a better resistance to yellowing. A correlation between the CL-OIT data and each of the MFI and YI data was found.

L9 **ANSWER 31 OF 191** CA COPYRIGHT 2003 ACS on STN

AN 133:310369 CA

TI Antioxidative **stability** measuring apparatus for **polymeric** solid materials
IN Tanasescu, Florin Teodor; Constantinescu, Virgil; Jipa, Silviu; Cramariuc, Radu; Cazac, Constantin; Setnescu, Radu; Setnescu, Tanta; Mihalcea, Ion

PA Rom.

SO Rom., 4 pp.

PI RO 110367 B1 19951229 RO 1991-147633 19910528

PRAI RO 1991-147633 19910528

AB The title app. includes a thermostatted elec. heater for the polymer specimen and a photomultiplier for **measuring** the intensity of the **luminescence** due to oxidn.; emitted light is passed through a waveguide filter and a diaphragm before reaching the photomultiplier. Elec. signals from the photomultiplier are integrated and amplified using an electromech. amplifier, converted into digital signals with a voltage-frequency converter, and displayed on a counting-displaying block.

~~**L9**~~ **ANSWER 33 OF 191** CA COPYRIGHT 2003 ACS on STN

AN 133:90165 CA

TI **Degradative luminescent** processes in atactic **polypropylene** II.
Chemiluminescence after a cold He plasma attack at -180°

AU Tiemblo, P.; Gomez-Elvira, J. M.; Teyssedre, G.; Laurent, C.

CS Instituto de Ciencia y Tecnologia de Polimeros (CSIC), Madrid, 28006, Spain

SO Polymer Degradation and Stability (2000), 68(3), 353-362

AB An atactic polypropylene sample was subjected to a series of cold He plasma treatments at -180° . The exptl. device employed enables the **simultaneous** measurement of the integral light emitted by the samples after the end of the treatment and its spectral anal. As in other polyolefins, three **luminescent** processes can be identified, phosphorescence, **chemiluminescence** and emission after charge recombination. The results were compared to those obtained for isotactic polypropylene, and in particular the **chemiluminescence** component was compared to the **chemiluminescence** arising from the thermooxidn. of the atactic sample.

L9 **ANSWER 34 OF 191** CA COPYRIGHT 2003 ACS on STN

AN 133:74720 CA

TI **Chemiluminescence** from oxidized polypropylene during temperature cycling

AU Rychly, J.; Matisova-Rychla, L.; Jurcak, D.

CS Polymer Institute, Slovak Academy of Sciences, Bratislava, 842 36, Slovakia

SO Polymer Degradation and Stability (2000), 68(2), 239-246

AB The **chemiluminescence measured** during temp. cycling over some temp. range reveals the complexity of the oxidn. of isotactic polypropylene much better than isothermal or ramp expts. It enables the characterization of the stages of oxidn. within one temp. cycle by corresponding values of apparent activation energy and pre-exponential factor. The independence of the rate const. of oxidn. on the extent of oxidn. within certain limits is thus demonstrated. It is shown that the Arrhenius plot for the increase of temp. in the first cycle of **decompn.** of **polypropylene** hydroperoxides in nitrogen covers the rate consts. of so-called faster decompg. hydroperoxides while that for subsequent cycles approaches the rate consts. of so-called slower decompg. hydroperoxides. The bimol. **decompn.** of hydroperoxides in initiation of **oxidn.** provides a unified approach to the 'heterogeneous' and 'homogeneous' interpretation of polypropylene oxidn.

L9 ANSWER 35 OF 191 CA COPYRIGHT 2003 ACS on STN
AN 133:74614 CA
TI Efficiency assessment of additives in thermal degradation of i-PP by **chemiluminescence**. II. Selenium
AU Jipa, Silviu; Setnescu, Radu; Setnescu, Tanta; Zaharescu, Traian
CS R and D Institute for Electrical Engineering, Bucharest, 74204, Rom.
SO Polymer Degradation and Stability (2000), 68(2), 165-169
AB The thermal **stability** of isotactic **polypropylene** **stabilized** with selenium and selenium/triazine deriv. combinations has been investigated by **chemiluminescence** in air at 180°C. The main kinetic parameters were detd. for three selenium concns. (0.15, 0.25, and 0.50 wt.%). The cooperative factors for selenium and some efficient triazines in oxidn. of i-PP were obtained for different triazine/Se ratios (0.3-3.3). A stabilization mechanism based on the modification of the selenium chem. state is proposed.

L9 ANSWER 37 OF 191 CA COPYRIGHT 2003 ACS on STN
AN 133:59526 CA
TI Efficiency assessment of additives in thermal degradation of i-PP by **chemiluminescence**. I. Triazines
AU Jipa, Silviu; Setnescu, Radu; Setnescu, Tanta; Zaharescu, Traian
CS R and D Institute for Electrical Engineering, Bucharest, 74204, Rom.
SO Polymer Degradation and Stability (2000), 68(2), 159-164
AB In this paper the kinetics of thermal oxidn. of isotactic polypropylene (i-PP) in the presence of some new mercaptotriazine antioxidants are presented. Isothermal degrading of i-PP was studied by **chemiluminescence** in air at 180°C on **polymer** samples contg. various concns. of **stabilizers** (0.15, 0.25, 0.50, and 0.75 wt%). The antioxidant efficiencies in thermal protection of i-PP were assessed by means of temporal parameters, **oxidn.** rates, relative activities, and **stabilities** relative to a std. (Irganox 565). The concn. consts. that characterize the stabilization effect of the triazinic antioxidants were calcd. and linear correlations between oxidn. induction time and σ -Hammett consts. could be pointed out.

L9 ANSWER 43 OF 191 CA COPYRIGHT 2003 ACS on STN
AN 132:195140 CA
TI Thermo-oxidative **stability** of polyamide 6 films II. **Chemiluminescence** techniques
AU Forsstrom, Dan; Reitberger, Torbjorn; Terselius, Bjorn
CS Department of Polymer Technology, Royal Institute of Technology, Stockholm, S-100 44, Swed.
SO Polymer Degradation and Stability (2000), 67(2), 255-261
AB **Chemiluminescence** (CL) and imaging **chemiluminescence** (ICL) were used to study the thermooxidative **stability** of **nylon 6** at 100-140°C. The CL intensity time curves for both unstabilized and stabilized film indicated an initial period at a high intensity level of varying shape followed by a basically sigmoidal increase and a subsequent max. This max. was found to occur at a time corresponding to a drop in strain at break. Polyamide stabilized with the phenolic antioxidant Irganox 1098 showed a similar CL curve although shifted towards lower intensity levels and longer times. The ICL study revealed essentially homogeneous oxidn. Both the ICL study and the CL studies clearly indicated oxidn. from the beginning of aging, also in the presence of the phenolic antioxidant. The CL intensity is not directly related to the rate of oxygen uptake. Instead, the CL intensity in oxygen seems to be related to the content of peroxides. However, other species causing **luminescence** cannot be excluded.

L9 ANSWER 46 OF 191 CA COPYRIGHT 2003 ACS on STN
AN 131:311113 CA

TI **Degradative luminescent processes in atactic polypropylene I. Chemiluminescence along the thermooxidation**
AU Tiemblo, P.; Gomez-Elvira, J. M.; Teyssedre, G.; Laurent, C.
CS Instituto de Ciencia y Tecnologia de Polimeros, (CSIC), Madrid, 28006, Spain
SO Polymer Degradation and Stability (1999), 66(1), 41-47
AB Two atactic polypropylene samples (a-PP) were thermally oxidized and their **chemiluminescence** recorded. The exptl. device employed has enabled the **simultaneous** measurement of the integral light emitted by the samples during oxidn. and its spectral anal. The results have been compared to those obtained for isotactic PP (i-PP), where it has been found that the **chemiluminescence** spectrum remains unchanged along the auto-acceleration stage of oxidn., while a gradual broadening and shift to longer wavelengths occurs as the kinetic curve approaches its intensity max. In a-PP a similar spectral evolution is found, as the spectra stay unchanged for a long period and then shift to higher wavelengths, though the correlation to kinetic stages is difficult in this case. The results have been interpreted, by analogy to the i-PP behavior, in terms of the spatial distribution of **oxidn.** along the thermal **degrdn.**

199 ANSWER 50 OF 191 CA COPYRIGHT 2003 ACS on STN
AN 131:215499 CA
TI Thermal oxidation of hydroxyl-terminated polybutadiene rubber II. Oxidation depth profiles studied by imaging **chemiluminescence**
AU Ahlblad, Gustav; Reitberger, Torbjorn; Terselius, Bjorn; Stenberg, Bengt
CS KTH, Department of Polymer Technology, Stockholm, S-100 44, Swed.
SO Polymer Degradation and Stability (1999), 65(2), 185-191
AB The **chemiluminescence** (CL) intensity during isothermal oxidn. in the surface-layer and in the core from hydroxyl-terminated polybutadiene rubber was measured by an imaging CL instrument. Skin-core oxidn. was obsd. and further indicated by IR spectroscopy in terms of a carbonyl index and in the relative absorption of unsatn. The oxidn. depth in pre-aged samples, in terms of CL depth profiles, was **evaluated** from imaging **chemiluminescence measurements** in nitrogen atm. The oxidn. depth in pre-aged samples was in agreement with the depth of the CL emission during in situ oxidn. Samples subjected to a sinusoidal dynamic-mech. compression during the oxidn. indicated a prolonged oxidn. in the surface layer.

199 ANSWER 51 OF 191 CA COPYRIGHT 2003 ACS on STN
AN 131:215498 CA
TI Thermal oxidation of hydroxyl-terminated polybutadiene rubber I. **Chemiluminescence** studies
AU Ahlblad, Gustav; Reitberger, Torbjorn; Terselius, Bjorn; Stenberg, Bengt
CS KTH, Department of Polymer Technology, Stockholm, S-100 44, Swed.
SO Polymer Degradation and Stability (1999), 65(2), 179-184
AB The **chemiluminescence** (CL) **intensity** from a hydroxyl-terminated polybutadiene (HTPB) rubber was measured during isothermal oxidn. at temps. ranging from 70 to 130°C. The CL isotherms were characterized by an approx. const. level of intensity followed by a **rapid** increase to a max. intensity. The initial intensity as well as the max. intensity levels of the different isotherms obeyed an Arrhenius expression, suggesting an invariable overall oxidn. mechanism. Total luminous intensity (TLI) values in nitrogen atm. were obtained at selected times during the isothermal oxidn. The TLI data showed a good correlation with the CL isotherm, indicating that the time course of the isotherm can be explained in terms of peroxide build-up and decompn. The build up of peroxides during oxidn. was shown from FTIR data to be accompanied by a build-up of carbonyl groups. Above a certain TLI level, FTIR data showed a significant decrease in unsatn., while swelling measurements showed an increase in the apparent crosslink d. This formation

of a secondary network later accelerated, with gradual depletion of oxygen in the specimen, causing severe embrittlement of the rubber.

~~L9~~ ANSWER 52 OF 191 CA COPYRIGHT 2003 ACS on STN
AN 131:200223 CA
TI **Chemiluminescence** spectral evolution along thermal oxidation of isotactic polypropylene
AU Tiemblo, Pilar; Gomez-Elvira, Jose Manuel; Teyssedre, Gilbert; Massines, Francoise; Laurent, Christian
CS Instituto de Ciencia y Tecnologia de Polimeros, CSIC, Madrid, 28006, Spain
SO Polymer Degradation and Stability (1999), 65(1), 113-121
AB Several isotactic polypropylene samples have been thermally oxidized and their **chemiluminescence** recorded. The exptl. device employed has allowed the **simultaneous** measurement of the integral and the spectral light emitted by the samples during oxidn. The spectrum of **chemiluminescence** remains unchanged along the auto-acceleration stage of oxidn., while a gradual broadening and shift to longer wavelengths occurs as the kinetic curve approaches its intensity max., a shift which continues as long as oxidn. does so. The shift to longer wavelengths originates in the disappearing of the low-wavelength emission (around 415 nm in isotactic polypropylene) which dominates the spectrum along the auto-acceleration stage, concomitant to a growing of longer wavelength components. Correlated stages exist in the kinetics and in the spectral evolution of the **chemiluminescent** emission along the thermal oxidn. of polypropylene.

L9 ANSWER 54 OF 191 CA COPYRIGHT 2003 ACS on STN
AN 130:338506 CA
TI The effect of oxygen pressure on the rate of polypropylene oxidation **determined by chemiluminescence**
AU Achimsky, L.; Audouin, L.; Verdu, J.; Rychla, L.; Rychly, J.
CS ENSAM, Paris, 75013, Fr.
SO European Polymer Journal (1999), 35(4), 557-563
AB The **chemiluminescence** of non-stabilized isotactic polypropylene films has been studied at 130 and 140°C at various concns. of oxygen in the flow of oxidizing gas introduced above the polymer sample. Results have shown that the max. level of **chemiluminescence** intensity is linearly proportional to the concn. of oxygen in the ga above the sample, i.e. to the concn. of oxygen in the polymer. A kinetic model based on a simple mechanistic scheme where the initiation of **oxidn.** results only from hydroperoxide **decompn.** was proposed. Approx. anal. solns. have been found in the case when $k_4k_6/k_{25} \ll 1$, k_4 , k_5 , k_6 being the termination rate consts., for resp. ($P_0 + P_0$), ($P + PI_{02}$) radicals. According to this approxn., the P_{002} concn. will be a hyperbolic function of the oxygen concn. The exptl. results may then be interpreted as: (1) in the conditions under study there is no sufficient oxygen concn. to scavenge all P_0 radicals, i.e. termination reactions involving these radicals are not negligible; (2) the results are consistent with the fact that the **chemiluminescence** would result directly from hydroperoxide **decompn.** rather than from P_{002} bimol. termination reaction.

L9 ANSWER 55 OF 191 CA COPYRIGHT 2003 ACS on STN
AN 130:183183 CA
TI **Chemiluminescence** as an industrial **test** method for antioxidant effectiveness in polyolefins: II. Versatile application aspects
AU Kohler, D. R.; Krohnke, C.
CS Additives Division, CIBA Specialty Chemicals Inc., Basel, CH-4002, Switz.
SO Polymer Degradation and Stability (1998), Volume Date 1999, 63(1), 165-173
AB **Chemiluminescence** (CL) was used to **monitor** oven ageing of polyolefins, with better accuracy in less time, since it allows use of lower antioxidant

concns. and thinner samples in a pure oxygen atm. Materials used to illustrate the method include non-stabilized isotactic polypropylene (Polychim A 10 TB, France) and various com. antioxidants, e.g., organophosphites, hindered amines (HAS), etc. A direct comparison between oven ageing at 135° and CL at 150° shows a good correlation between the two methods, therefore chemiluminescence offers the same information on long term thermal stability in a much shorter time than the conventional oven ageing technique. Chemiluminescence is esp. suited for HAS based systems, where visible failure features such as development of discoloration are often missed in oven ageing tests.

L9 ANSWER 56 OF 191 CA COPYRIGHT 2003 ACS on STN
AN 130:82058 CA
TI Imaging chemiluminescence technique applied to thermo-oxidation of polymers. Possibilities and limitations
AU Ahlblad, Gustav; Reitberger, Torbjorn; Terselius, Bjoern; Stenberg, Bengt
CS Department Polymer Technology, KTH, Stockholm, S-10044, Swed.
SO Angewandte Makromolekulare Chemie (1998), 261-262, 1-7
AB A review with 23 refs. The imaging photon counting technique was introduced to study polymer oxidn. at the beginning of the 90s. The technique, referred to as imaging chemiluminescence (ICL), enables the measurement of both the intensity and the spatial distribution of the weak luminescence from thermo-oxidized polymers. In the short history of ICL measurements the technique has provided data of various aspects of the heterogeneous oxidn. of polymers, e.g. diffusion-limited oxidn., localization of stress-induced oxidn., and the phys. spreading of oxidn. The advances in ICL are briefly summarized and recent results obtained by monitoring the oxidn. depth profiles in polybutadiene rubber and the phys. spreading of oxidn. between EPDM particles are presented. The potential and the limitations of the technique are discussed in some detail.

L9 ANSWER 57 OF 191 CA COPYRIGHT 2003 ACS on STN
AN 130:53543 CA
TI Chemiluminescence in studying the thermal oxidation of rubber compounds
AU Burlett, D. J.; Zlatkevich, L.
CS The Goodyear Tire and Rubber Company, Akron, OH, USA
SO Proceedings of the Conference of the North American Thermal Analysis Society, 26th, Cleveland, Sept. 13-15, 1998 (1998), 463-468. Editor(s): Williams, Kathryn R. Publisher: Omnipress, Madison, Wis.
AB It is shown that single-photon counting capability is not the necessary condition for successful application of chemiluminescence in polymer research. The instrument that measures integral photocurrent and utilizes proper methodol. can be efficiently employed, even in evaluation of such low-emitting compds. as vulcanizates contg. 40 phr of carbon black. The usefulness of the technique is demonstrated for a variety of elastomeric systems: unvulcanized and vulcanized compns. as well as formulations with fillers and antioxidants. Numerous examples of good correlation between chemiluminescence and differential scanning calorimetry are presented.

L9 ANSWER 58 OF 191 CA COPYRIGHT 2003 ACS on STN
AN 129:317402 CA
TI Stabilization of PACREL by organotellurium compound
AU Malmstrom, Jonas; Engman, Lars; Bellander, Martin; Jacobsson, Karin; Stenberg, Bengt; Lonnberg, Viveca
CS Institute of Chemistry, Department of Organic Chemistry, Uppsala University, Uppsala, S-751 21, Swed.
SO Journal of Applied Polymer Science (1998), 70(3), 449-456
AB The addn. of 0.17-0.50% of bis[4-(dimethylamino)phenyl]telluride to the

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thermoplastic elastomer PACREL significantly improved tensile strength and elongation at break in unaged and oven-aged samples. **Chemiluminescence measurements** showed that the organotellurium compd. considerably prolonged the induction period of thermooxidn. of the material and drastically reduced the total **luminescence intensity** of unaged and aged samples. These results indicate that the improved mech. properties of diaryl telluride stabilized PACREL can be attributed to the antioxidative (peroxide decomp., chain breaking) properties of the stabilizer.

LB
AN
TI
AU
CS
SO
AB

ANSWER 59 OF 191 CA COPYRIGHT 2003 ACS on STN
129:176077 CA

Chemiluminescence study on the **oxidation** of several polyolefins-I. Thermal-induced **degradation** of additive-free polyolefins
Setnescu, Radu; Jipa, Silviu; Osawa, Zenjiro
ICPE-Research Institute for Electrical Engineering, Bucharest, 74204, Rom.
Polymer Degradation and Stability (1998), 60(2-3), 377-383
Chemiluminescence (CL) has been applied to **evaluate** the oxidn. susceptibility of various polyolefins: low-d. polyethylene (LDPE), linear low-d. polyethylene (LLDPE), high-d. polyethylene (HDPE) and isotactic polypropylene (i-PP). The intensity of CL emission in inert atm. could be related to the previous oxidn. level. The thermal stability at 170°C of the hydroperoxides in LDPE seems to be lower than that in LLDPE or HDPE. The kinetic parameters of the oxidn. at 170°C in oxygen, calcd. from CL data, suggest the following stability order: HDPE>LLDPE>LDPE>i-PP. The intensity of CL emission was related to the CH3 content as evaluated by Fourier transform infra-red spectroscopy.

L9
AN
TI
AU
CS
SO
AB

ANSWER 70 OF 191 CA COPYRIGHT 2003 ACS on STN
127:149760 CA

Chemiluminescence in thermal oxidation of ABS
Parikh, Sunil S.; Zlatkevich, Lev
Bayer Corporation, Springfield, MA, 01151, USA
Angewandte Makromolekulare Chemie (1997), 247, 255-268
Two concepts in the **chemiluminescence** research, the heterogeneous model and the kinetic approach, are discussed. The anal. of published data obtained by a highly sensitive photon-counting system reveals the contradictory nature of the heterogeneous model and proves its inconsistency. On the other hand, the kinetic approach was successfully applied to evaluation of thermal oxidn. in a variety of systems, ABS compns. in particular. Emulsion grade ABS were found to be essentially less stable than ionic mass polymn. products. Among the antioxidants studied, Santonox R is clearly more efficient than Irganox 1076. In emulsion grades the superiority of Santonox R to Irganox 1076 is reflected primarily in larger induction period, while in ionic resin it is mostly due to smaller oxidn. rate const. values. The introduction of UV stabilizers by themselves has no influence on durability in either ionic or emulsion resins. Similarly to systems without UV stabilizers, Santonox R is more efficient than Irganox 1076 in mixts. with UV stabilizers as well. The comparative study of various ABS-coloring agent compns. by **chemiluminescence** and DSC reveals much greater sensitivity of the former. While DSC lets one make only a trivial conclusion that the introduction of an antioxidant improves stability, **chemiluminescence** shows the differences in durability as large as 3-4 times for the samples DSC fails to distinguish. In addn., **chemiluminescence** furnishes a significant insight on the factors affecting stability. The DSC thermal **oxidative stability** data can be related to resistance to **oxidn.** during processing, whereas the **chemiluminescence** results are expected to be useful in predicting materials' lifetime at service temps.

L9 ANSWER 72 OF 191 CA COPYRIGHT 2003 ACS on STN
AN 126:239153 CA
TI **Chemiluminescence assessment** of the effectiveness of some phenolic antioxidants for **heat stabilization** of irradiated LDPE
AU Jipa, Silviu; Osawa, Zenjoro; Otsuki, Harumi; Nishimoto, Masaharu
CS ICPE-Research and Design Institute for Electrical Engineering, Bucharest, 74204, Rom.
SO Polymer Degradation and Stability (1997), 56(1), 45-53
AB The inhibition of thermal- and irradiation-oxidation of LDPE in the presence of a no. of phenols was studied using the **chemiluminescence** method. 1-Pyrenol and various phenanthrol isomers were compared with a no. of com. available phenolic antioxidants. The following order of efficiency was found: Irganox 1330 > 1-pyrenol > Sumilizer MDP-S > Sumilizer MDP-S > 4-phenanthrol > 1-phenanthrol > 3-phenanthrol > Sumilizer GM-S > 2-phenanthrol > Sumilizer GS > 8-quinolinol > Sumilizer BHT. The antiradiation effect of the studied anti-oxidants in LDPE follows, up to 10 Mrad, the same efficiency order as in the thermal oxidation.

L9 ANSWER 74 OF 191 CA COPYRIGHT 2003 ACS on STN
AN 126:158250 CA
TI Stabilization of plasticized poly(vinyl chloride) by 3-mercapto-1,2,4-triazin-5-one derivatives
AU Karimov, F. C.; Mazitova, A. K.; Khamaev, V. Kh.; Zaikov, G. E.; Minsker, K. S.
CS Bashkir State University, Ufa, 450076, Russia
SO Polymer News (1996), 21(10), 360-361
AB The stabilizing effect of 3-mercapto-4-amino-6-furfuryl-1,2,4-triazin-5-one (I), 3-mercapto-6-furfuryl-1,2,4-triazin-5-one (II), and 3-(methylthio)-4-amino-6-furfuryl-1,2,4-triazin-5-one (III) on the thermal **oxidative degradation** of plasticized PVC was investigated by **chemiluminescence measurements**. The prep. of I-III is described. I-III showed a marked inhibiting effect on the degradation of PVC. The stabilizing effect decreased in the order II > I > III.

L9 ANSWER 79 OF 191 CA COPYRIGHT 2003 ACS on STN
AN 124:203885 CA
TI **Chemiluminescence** in evaluating thermal oxidative stability of acrylonitrile-butadiene-styrene (ABS) copolymers. IV. Comparative study of various **stabilizers** in mass polymerization and emulsion resins
AU Parikh, Sunil S.; Zlatkevich, Lev
CS Monsanto Chemical Co., Springfield, MA, 01151, USA
SO Journal of Environmental Polymer Degradation (1996), 4(1), 65-9
AB The thermal **oxidative stability** of ionic and emulsion ABS with various antioxidants and UV stabilizers was studied. Santonox R provides better protection than Irganox 1076 for both resins. This also applies to formulations with Tinuvin 770 and Tinuvin 328.

L9 ANSWER 88 OF 191 CA COPYRIGHT 2003 ACS on STN
AN 121:232233 CA
TI **Chemiluminescence** in evaluating the thermal oxidative stability of acrylonitrile-butadiene-styrene (ABS) copolymers. 1. Influence of stabilizers and lubricants
AU Parikh, Sunil S.; Zlatkevich, Lev
CS Monsanto Chem. Co., Springfield, MA, 01151, USA
SO Journal of Environmental Polymer Degradation (1993), 1(2), 107-10
AB The influence of lubricants, UV stabilizers, antioxidants, and metal deactivators on the resistance of ABS to thermal oxidation was studied by means of the **chemiluminescence** technique. Neither of the additives seems to affect significantly the induction period of oxidation. At the same time, the

influence of various additives on the oxidn. rate const. is remarkably different: the introduction of lubricants and UV stabilizers increases its value, while antioxidants and metal deactivators have the opposite effect. For the particular systems studied durability is decreased in samples contg. the lubricant and UV stabilizers and increased in samples stabilized with the antioxidant and metal deactivator.

L9 ANSWER 91 OF 191 CA COPYRIGHT 2003 ACS on STN
AN 121:36839 CA
TI **Chemiluminescence** in evaluating the thermal oxidative stability of ABS and ABS/polycarbonate blends
AU Parikh, Sunil S.; Zlatkevich, Lev
CS Monsanto Chem. Co., Springfield, MA, 01151, USA
SO Polymer Preprints (American Chemical Society, Division of Polymer Chemistry) (1993), 34(2), 229-30
AB **Oxidative stability** of ABS (Lustran LGA)-polycarbonate (Lexan) blends was evaluated in the presence of various additives. The antioxidants studied were phenolic antioxidants (Irganox 1076, Irganox MD 1024), and phosphite antioxidant Irgaphos 168. Light stabilizers, Tinuvin 770, 144, and 328 and organometallic salt (Glycolube TS) lubricant were used.

L9 ANSWER 92 OF 191 CA COPYRIGHT 2003 ACS on STN
AN 121:36731 CA
TI **Rapid chemiluminescence analysis**
AU Mattson, Bengt; Reitberger, Torbjoern; Stenberg, Bengt; Terselius, Bjoern
CS Dep. Polym. Technol., R. Inst. Technol., Stockholm, S-100 44, Swed.
SO Polymer Preprints (American Chemical Society, Division of Polymer Chemistry) (1993), 34(2), 250-1
AB A **chemiluminescence** instrument is described which is designed for very rapid analyses, less than 20 s, of specimens in the solid state. A no. of selected expts. are presented utilizing this instrument in the study of **oxidative degrdn.** of OH-terminated polybutadiene, carbon black-filled EPDM rubber, and paper coatings.

L9 ANSWER 97 OF 191 CA COPYRIGHT 2003 ACS on STN
AN 120:271401 CA
TI Application of **chemiluminescence** to polymer degradation studies. Thermal **oxidation** of polyamide 6
AU Matisova-Rychla, I.; Lanska, B.; Rychly, J.
CS Polym. Inst., Slovak Acad. Sci., Bratislava, 842 36, Slovakia
SO Angewandte Makromolekulare Chemie (1994), 216, 169-86
AB **Chemiluminescence** (CL) technique was used to study the thermal oxidn. of polyamide 6 samples with different ratio of terminal basic and acid groups, which has a distinct effect on kinetics of the isothermal CL-time runs at 120-140°. The isothermal expts. are complemented by nonisothermal ramp expts. where the CL intensity is monitored against temp. at a programmed rate of temp. increase. The relation of parameters such as initial CL intensity, integrated value of CL intensity for both isothermal and nonisothermal expts., and rate consts. corresponding to CL-time curves was discussed within the results of other **oxidn. stability** tests such as absorption of O, thermogravimetry, etc.

L9 ANSWER 99 OF 191 CA COPYRIGHT 2003 ACS on STN
AN 120:78133 CA
TI **Chemiluminescence** imaging of polymer materials under thermal oxidation and stress
AU Hosoda, Satoru; Seki, Yoshinori; Kihara, Hayato
CS Chiba Res. Lab., Sumitomo Chem. Co. Ltd., Ichihara, 299-01, Japan

SO Polymer (1993), 34(22), 4602-6
AB **Chemiluminescence** imaging was successfully carried out for some polymer materials under heating or mech. stress using a 2-dimensional photoelectron detector. **Oxidative degrdn.** could be visualized for the press-molded sheets of Nylon 6 (I), polystyrene (II), and for the multilayered sheet composed of polyethylene (III) and styrene-butadiene triblock copolymer (IV) by heating samples at 50-154° in air. The **chemiluminescence intensity** varied over the surface of the sample specimen; the surface trimmed with a razor blade and the cracked portion exhibited esp. strong **luminescence** for I and II samples. The difference in the oxidn. reaction rate between the two kinds of materials could be visualized clearly for the multilayered sheet of III and IV. Stress-induced **luminescence** was obsd. on drawing I at room temp., and the **luminescence** was remarkably strong around the stress-concd. part of the specimen.

L9 ANSWER 104 OF 191 CA COPYRIGHT 2003 ACS on STN
AN 118:125711 CA
TI The application of **simultaneous chemiluminescence** and thermal **analysis** for studying the glass transition and **oxidative stability** of poly(N-vinyl-2-pyrrolidone)
AU Scheirs, J.; Bigger, S. W.; Then, E. T. H.; Billingham, N. C.
CS Dep. Mech. Manuf. Eng., Univ. Melbourne, Parkville, 3052, Australia
SO Journal of Polymer Science, Part B: Polymer Physics (1993), 31(3), 287-97
AB A computer-controlled **chemiluminescence** (CL) instrument incorporating a differential scanning calorimeter was used to simultaneously acquire photochem. and enthalpic data for poly(N-vinyl-2-pyrrolidone) (I). Samples were subjected to a linear temp. ramp under N and their **luminescence** response recorded. The resultant dynamic CL peak was attributable to the decompn. of hydroperoxide groups and the subsequent mutual termination of secondary polymer peroxy radicals. Thus, dynamic CL could be used to characterize the level of oxidn. in I, which in com. samples, may be partly related to the level of residual polymn. initiator and to the drying process. The temp. at which max. CL emission occurred correlated with the glass transition temp. (Tg) of I which increased with increasing mol. wt. A marked increase in the Tg of I occurred after it was aged in air for 24 h at 120°. This was due to the loss of adsorbed moisture from the polymer which was confirmed by thermogravimetric anal. Oxidn. profiles of I were obtained by plotting the integrated CL peak area as a function of aging time. The profiles were compared with data obtained from isothermal CL and viscosity measurements. Gas perturbation expts. suggested that when drying I under N at elevated temps. significant populations of long-lived macroalkyl radicals were formed which could peroxidize the polymer on exposure to air.

L9 ANSWER 108 OF 191 CA COPYRIGHT 2003 ACS on STN
AN 117:90871 CA
TI Effect of chromium residues on the **stability** of gas-phase high-density **polyethylene** produced by supported catalysts
AU Scheirs, J.; Bigger, S. W.; Billingham, N. C.
CS Dep. Mech. Manuf. Eng., Univ. Melbourne, Parkville, 3052, Australia
SO Journal of Polymer Science, Part A: Polymer Chemistry (1992), 30(9), 1873-89
AB The thermooxidative stability of HDPE prep'd. by silica-supported Ziegler-Natta, bis(triphenylsilyl)chromate, and bis(cyclopentadienyl) Cr(II) (I) catalyst systems is **examd.** by **chemiluminescence** (CL) techniques and thermogravimetric **anal.** The technique of dynamic CL in N allows to simultaneously det. the concn. of **polymer** hydroperoxides and their relative **stability**. Polymer hydroperoxides in Ziegler-Natta-catalyzed HDPE are relatively stable because Ti and Al residues are poor pro-oxidants compared

with Cr residues. HDPE produced by I has a low intrinsic thermooxidative **stability** due to the Cr-catalyzed conversion of **polymer** hydroperoxides into **degrdn.** products during thermal aging. Concns. of residual Cr as low as 1 ppm can profoundly affect the **oxidative stability** of **polymers** and exert a much greater influence than either the extent of branching or the degree of unsatn. The appearance of the silica catalyst support before and after gas-phase polymn. is studied by SEM. During polymn., the silica support shatters and the resulting submicron fragments are dispersed throughout the polymer particles. On exposure of the nascent polymer to the atm., simultaneously I is converted to a trivalent Cr species which remains assocd. with the silica substrate. The pressure of trivalent Cr in the poisoned Cr catalyzed is confirmed by UV/visible spectrophotometry and the nature of the Cr(III) species is investigated by diffuse reflectance FTIR spectroscopy. The high surface area of the catalyst residue is a powerful pro-oxidant despite its low concn.

L9 ANSWER 113 OF 191 CA COPYRIGHT 2003 ACS on STN

AN 116:236712 CA

TI A **chemiluminescence** study of the thermooxidative degradation of copolymers

AU Memetea, Tatiana; Vuluga, Zina; Hagiopol, Cornel

CS Cent. Plast. Mater. Res., ICECHIM, Bucharest, 79611, Rom.

SO International Journal of Polymeric Materials (1991), 15(3-4), 187-95

AB The in-situ thermal **oxidative degrdn.** of ABS copolymers, initiated by Bz2O2, is followed by **chemiluminescence** (CL) **measurements**. When conducted in the presence of an antioxidant, this gives a quick means of antioxidant efficiency evaluation. ABS contg. antioxidants of various classes such as Irganox 1076, Irganox 565 (I) tris(nonylphenyl) phosphite (II), and dialkyl thioldipropionate is tested. The study is carried out on the CL signal of the hydroperoxides in the SAN phase produced by Bz2O2-initiated oxidn. or processing. The best protection efficiency is found for I and II. The results are confirmed by impact strength testing. The conditions for correct antioxidant efficiency evaluation are discussed.

L9 ANSWER 114 OF 191 CA COPYRIGHT 2003 ACS on STN

AN 116:236314 CA

TI Imaging of autoxidation-induced **chemiluminescence**

AU Fleming, Ronald H.; Craig, Angela Y.

CS Charles Evans and Assoc., Redwood City, CA, 94063, USA

SO Polymer Degradation and Stability (1992), 37(2), 173-80

AB Autoxidn.-induced polymer **chemiluminescence** is **measured** with a position-sensitive, photon-counting **detector** to produce **chemiluminescence** images. The **chemiluminescence intensity** varies over the surfaces of some polymer samples. The localized response of **chemiluminescence intensity** to temp. leads to images of activation energy with the Arrhenius parameters shown for every position on the sample. High values of light intensity and high activation energies correlate with cracks and edges in a hydroxy-terminated polybutadiene/isophorone diisocyanate resin. Variations in the **chemiluminescence** Arrhenius parameters are caused by different rate-controlling steps in the autoxidn. reaction mechanism. **Chemiluminescence** imaging demonstrates lateral variation in the polymer autoxidn. reaction mechanism.

L9 ANSWER 115 OF 191 CA COPYRIGHT 2003 ACS on STN

AN 115:184536 CA

TI The effect of stabilizers on integrated **chemiluminescence** in the early stages of polypropylene photo-oxidation

AU George, Graeme A.; Ghaemy, Mousa

CS Dep. Chem., Univ. Queensland, Queensland, 4072, Australia

SO Polymer Degradation and Stability (1991), 34(1-3), 37-53
AB The integrated **chemiluminescence** obtained by heating photooxidized polypropylene films in an inert atm. is affected by a no. of common stabilizers, particularly free-radical scavengers, such as hindered phenols, and OOH decomposers, such as thiodipropionate esters. These stabilizers must be removed prior to **chemiluminescence anal.** of the OOH content in the early stages of photooxidn. From an anal. of the effect of stabilizers on the peak in OOH concn. obsd. after short times of UV irradiation with wavelengths >300 nm, only the thiodipropionate ester and a 2-hydroxybenzophenone UV absorber affected the kinetics of OOH formation and decomposition and increased the induction period as measured by carbonyl index. A hindered (PhO)3P produced an immediate increase in integrated **chemiluminescence** and was a pro-degradant unless a hindered phenol was incorporated to inhibit peroxy radical attack on the stabilizer. A com. hindered piperidine caused a lowering of the **chemiluminescence** when the sample was heated for **anal.**, consistent with a weak radical scavenging and OOH-decomposition activity of the amine, but did not affect the kinetics of formation and decomposition of OOH on UV irradiation.

L9 ANSWER 117 OF 191 CA COPYRIGHT 2003 ACS on STN
AN 115:30068 CA
TI **Chemiluminescence** of the thermo-oxidative degradation of polyolefins
AU Osawa, Zenjiro; Tsurumi, Kenji; Konoma, Fujiko
CS Fac. Eng., Gunma Univ., Kiryu, 376, Japan
SO Materiariu Raifu (1990), 2(3), 162-6
AB The **chemiluminescence** method was applied to **evaluate** the thermal oxidative stability of HDPE, isotactic polypropylene (I), polybutene (II), and poly(4-methylpentene) (III). The increasing order of the **chemiluminescent** intensity of the polyolefins coincided with that of the O uptake rate. The thermal oxidative stability of the polymers estd. by both **chemiluminescent** and O uptake methods decreased in the following order: HDPE » III > I > II. At an equiv. oxidation level the **chemiluminescence** intensity of HDPE was much lower than that of the other polymers providing tertiary hydrogens in the polymer chains. On the basis of the results obtained the oxidation mechanism of HDPE was discussed.

L9 ANSWER 119 OF 191 CA COPYRIGHT 2003 ACS on STN
AN 113:212793 CA
TI **Chemiluminescence** parameter for the degradation of polyolefins
AU Kihara, Hayato; Hosoda, Satoru
CS Chiba Res. Lab., Sumitomo Chem. Co., Ltd., Ichihara, 299-01, Japan
SO Polymer Journal (Tokyo, Japan) (1990), 22(9), 763-70
AB The **chemiluminescence** time-courses of polyethylene and polypropylene under heating in air or inert gas were observed and simulated on the basis of kinetic anal. **Chemiluminescence** parameters, such as peak-top intensity, integrated intensity during measurement, steady state intensity, and **chemiluminescence** decay rate, strongly correlated with the stability of polymer materials, judging from correspondence with the results of durability tests on the same materials. The relationship between the **chemiluminescence** and the structural characteristics of the polymer was also investigated.

L9 ANSWER 124 OF 191 CA COPYRIGHT 2003 ACS on STN
AN 111:215423 CA
TI **Evaluation** of some commercial copper deactivators by **chemiluminescence**
AU Osawa, Zenjiro; Tsurumi, Kenji
CS Fac. Eng., Gunma Univ., Kiryu, 376, Japan
SO Polymer Degradation and Stability (1989), 26(2), 151-60
AB The effects of various transition metal stearates (Ti, V, Cr, Mn, Fe, Co,

Ni, Cu, Zn), some com. deactivators, and calixarene (cyclic oligomers of a phenol deriv.) on the thermo-oxidative degradn. of polypropylene (I) were evaluated by the chemiluminescence method and comparison with O uptake results. The time required to observe chemiluminescence (t) was largely dependent on the kind of transition metal added to I and the relative catalytic order was as follows: Co > Cr > Mn > Fe > Cu > Ni > V > Zn > Ti » pure. On addn. of the Cu deactivators, t was delayed and the inhibiting order was as follows: Mark CDA-1 > Chel-180 > OABH > Mark CDA-6. The order detd. by the chemiluminescence method coincided fairly closely with those obsd. by the O uptake method. Calixarene provides not only a Cu deactivating function but also an antioxidizing one which was inferior to that of BHT.

L9 ANSWER 132 OF 191 CA COPYRIGHT 2003 ACS on STN
AN 109:23718 CA
TI Chemiluminescence studies of the thermooxidation of PEEK
AU Brauman, S. K.; Pronko, J. G.
CS Lockheed Palo Alto Res. Lab., Palo Alto, CA, 94304-1191, USA
SO Journal of Polymer Science, Part B: Polymer Physics (1988), 26(6), 1205-16
AB A highly sensitive microcomputer-controlled chemiluminescence app. capable of spectral resolu. of emitted light was used to study the oxidn. of thermoplastic matrix material PEEK at 110° in O. Even after prolonged exposure and extensive decay in the chemiluminescence signal, the samples showed no change in properties or accumulation of oxidn. products. Evidence suggested that after O-assisted initiation, reaction proceeded by radical transfer primarily of polymer phenoxy radicals in a type of radical arom. substitution reaction on PEEK. Similar substitution-type biomol. termination of polymer phenoxy radicals can lead to excited polymer and benzoquinone, emitters that account for much of the oxyluminescence spectrum of PEEK. Under the exptl. conditions, the benzoquinone was volatile and the product polymer should be indistinguishable from starting polymer.

L9 ANSWER 143 OF 191 CA COPYRIGHT 2003 ACS on STN
AN 103:161202 CA
TI Chemiluminescence in thermal oxidation of polymers: apparatus and method
AU Zlatkevich, L.
CS Pola Co., Skokie, IL, 60077, USA
SO ACS Symposium Series (1985), 280(Polym. Stab. Degrad.), 387-409
AB The title method was used to det. the thermal stability of polymers by measuring the intensity of the light emitted during thermal oxidn. The method was more sensitive than other polymer stability techniques. The induction times and the oxidn. rates for polypropylene [9003-07-0] and ABS polymer [9003-56-9] and the extent of the oxidn. in nylon under different conditions were evaluated by the chemiluminescence method. The method was faster and less tedious than the air-oven aging test and was more sensitive than DSC and the O2-uptake methods. The appearance of the low-temp. pulses on the chemiluminescence curves before the onset of the autocatalytic process was related to the quality of the polymers.

L9 ANSWER 145 OF 191 CA COPYRIGHT 2003 ACS on STN
AN 103:142507 CA
TI Chemiluminescence study of polymer oxidation stability
AU Zlatkevich, Lev
CS Pola Co., Skokie, IL, 60077, USA
SO Journal of Polymer Science, Polymer Physics Edition (1985), 23(8), 1691-702
AB The application of the chemiluminescence technique to the study of polymer oxidative stability is discussed. For the initial stages of oxidn. a sigmoidal change in the chemiluminescence intensity with time is justified

when the expt. is performed isothermally at high O pressure, whereas at low O pressure and const. heating rate an exponential increase in the **chemiluminescence intensity** is expected. For advanced stages of oxidn. depending on the ratio between the initial and equil. levels of hydroperoxides, the intensity of emitted light may either grow or decay until the equil. concn. of hydroperoxides is established. Two major parameters of an autocatalytic oxidn. (induction time and oxidn. rate) can be obtained by carrying out the expt. in an O atm. at const. temp. Alternatively, the extent of oxidn. in a certain temp. region can be evaluated when a const.-heating-rate expt. is conducted under N.

L9 ANSWER 147 OF 191 CA COPYRIGHT 2003 ACS on STN
AN 102:132780 CA
TI A simple photon counter using the BBC micro-computer for measurements of oxyluminescence from polymers
AU O'Keefe, E. S.; Billingham, N. C.
CS Sch. Chem. Mol. Sci., Univ. Sussex, Brighton, BN1 9QJ, UK
SO Polymer Degradation and Stability (1985), 10(2), 137-45
AB A photon counter capable of **measuring luminescence** assocd. with the **oxidative degrdn. of polymers** at count rates of a few Hertz, is described. Control of sample environment, counting of pulses, and collection and anal. of data are controlled by a simple, inexpensive microcomputer. **Luminescence** results for nylon 66 [32131-17-2] are described.

*L9 ANSWER 163 OF 191 CA COPYRIGHT 2003 ACS on STN
AN 97:183078 CA
TI **Chemiluminescence** apparatus and method for **determining the oxidative stability of polymers**
IN Broutman, Lawrence J.; Rozhansky, Boris; Zlatkevich, Lev
PA USA
SO U.S., 8 pp.
PI US 4350495 A 19820921 US 1980-214231 19801208
PRAI US 1980-214231 19801208
AB The title app. measures light intensity as a function of time from polymers in an oxidizing atm., giving data from which induction time and oxidn. rate can be calcd. The app. enables **simultaneous**, multisample anal. and computer calcn.

L9 ANSWER 168 OF 191 CA COPYRIGHT 2003 ACS on STN
AN 93:150866 CA
TI Prediction of service life in photooxidation of polypropylene
AU Nemzek, Thomas L.; Mayo, Frank R.
CS SRI Int., Menlo Park, CA, 94025, USA
SO Polymer Preprints (American Chemical Society, Division of Polymer Chemistry) (1978), 19(1), 679-82
AB Methods for detecting chem. changes during induction in the photooxidn. of **stabilized** and unstabilized **polypropylene** (I) [9003-07-0] films were evaluated. The methods were O absorption during photooxidn., induction periods with thermogravimetric anal. at 170°, detn. of CO groups with dinitrophenylhydrazine, detn. of hydroperoxide with Ph3P, and **chemiluminescence**. The changing rates of **oxidn.** during induction periods in photooxidns. of **stabilized** (0.2% Irganox 1076 [2082-79-3]) and unstabilized I by the most promising method, i.e. detn. of very small pressure changes in a very small cell.

L9 ANSWER 169 OF 191 CA COPYRIGHT 2003 ACS on STN
AN 93:115309 CA
TI A **chemiluminescence** instrument for studying the effects of environment on

polymer aging

AU Fanter, D. L.; Levy, R. L.; Lippold, K. O.

CS Res. Lab., McDonnell Douglas Corp., St. Louis, MO, 63166, USA

SO Organic Coatings and Plastics Chemistry (1978), 39, 603-6

AB An instrument has been developed for the **detn.** of **chemilumin** **scence** emitted during **thermooxidative** reactions in polymers exposed to a simulated service environment. The system is sufficiently sensitive to detect low reaction rates occurring in polymers at temp. as low as 60°.

L9 ANSWER 173 OF 191 CA COPYRIGHT 2003 ACS on STN

AN 88:23774 CA

TI Study of the effect of 2,4,6-trisubstituted phenols on the thermooxidative **stability** of **polypropylene** by the **chemiluminescence** method

AU Matisova-Rychla, L.; Ambrovic, P.; Kulickova, N.; Rychly, J.; Holcik, J.

CS Polym. Inst., Slovak Acad. Sci., Bratislava, Czech.

SO Journal of Polymer Science, Polymer Symposia (1977), Volume Date 1976, 57(Degradation Stab. Polyolefins), 181-9

AB An examn. of a group of trisubstituted phenol antioxidants (I, R = H, Me, Et, Pr, Me3C, Bz, Ph(CH3)2C, Ph(CH3)CH, cyclohexyl, CH2CH2CO2C18H37) showed that effectiveness increased with increased size and chain length of R, esp. when R is arom., and branching had a neg. effect. The stabilizing activity of an antioxidant is influenced by its compatibility with the polymer and volatility at a given temp. At lower temps., **stabilizer** compatibility with the **polymer** prevails, whereas at high temps. the effect of volatility has a greater influence. Good agreement was obtained between stabilizer activity **measurements** obtained by the **chemiluminescence** method and those obtained by O absorption.

L9 ANSWER 186 OF 191 CA COPYRIGHT 2003 ACS on STN

AN 71:71364 CA

TI Simple device for routine measurements of the **oxidation-stability** of **polymers** by oxyluminescence

AU Hol, A. H. M.; De Kock, R. J.

CS Cent. Lab., DSM, Geleen, Neth.

SO Journal of Scientific Instruments (1969), [2] 2(9), 812-13

AB The oxyluminescence generated upon oxidn. of many polymer types can be measured in a simple way by means of a device examg. several samples at once. The oxylumeter gives a **rapid** detn. of the induction periods of the **polymers**, so that routine examn. of the **oxidn. stability** is made easy.

L9 ANSWER 191 OF 191 CA COPYRIGHT 2003 ACS on STN

AN 57:17435 CA

OREF 57:3614b-c

TI Oxyluminescence-new tool for testing the **stability** of **polymers**

AU Ashby, G. E.

CS W. R. Grace & Co., Clarksville, MD

SO SPE Transactions (1962), 2, 161-3

AB The importance of O in the **measurement** of **luminescence** of polymers is outlined. The app. and method are described. A linear relation was found between the integrated intensity of the light and the no. of carbonyl groups formed. The method may also be used for screening chemicals for antioxidant action.

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